

SESSÃO PROBLEMAS 13 6.1, 6.2, 6.3

6.1)

a) $4 \rightarrow CPI = 1/4 \rightarrow \underline{0,25 \text{ c/i}}$

b) $20 \cdot 4 \rightarrow \underline{80 \text{ i/c}}$

c) $CPI = 0,25 + 0,2 \cdot 20 = \underline{4,25 \text{ c/i}}$

d) $\frac{4,25}{0,25} = \underline{17x}$

e) $CPI = 0,25 + 0,05 \cdot 20 = \underline{0,45 \text{ c/i}}$

f) $\text{Speedup} = \frac{4,25}{0,45} \rightarrow \underline{9,44}$

6.2)

a) $IPC = \frac{10^9}{10^9} = \underline{1 \text{ i/c}}$

$OPE = \frac{4 \cdot 10^9}{10^9} = \underline{4 \text{ o/f}}$

b) 4 i/c

c) $0,6 \cdot 10^9 + 0,4 \cdot 10^9 \cdot 2 = \underline{1,4 \cdot 10^9 \text{ c}}$

d) $IPC = \frac{10^9}{1,4 \cdot 10^9} = \underline{0,714 \text{ i/c}}$ $OPE = \frac{4 \cdot 10^9}{1,4 \cdot 10^9} = \underline{2,86 \text{ o/c}}$

e) $4/16 = \underline{0,25}$

f) $0,6 \cdot 10^9 + 0,25 \cdot 0,4 \cdot 10^9 \cdot 2 + 0,75 \cdot 0,4 \cdot 10^9 = \underline{1,1 \cdot 10^9 \text{ c}}$

g) $IPC = \frac{10^9}{1,1 \cdot 10^9} = \underline{0,909 \text{ i/c}}$ $OPE = \frac{4 \cdot 10^9}{1,1 \cdot 10^9} = \underline{3,64 \text{ o/c}}$

6.3)

a) $\text{Speedup max} = \frac{200}{0,05 \cdot 200 + 0,1200} \rightarrow \underline{6,67x}$

b) $t(N) = 30 + \frac{170}{N} + N$

c) $0 = 30 + \frac{170}{N} + N \rightarrow N = \sqrt{170} \approx \underline{13}$

d) $q_{max} = \frac{200}{30+26} = \underline{3,57x}$

e) $q_{max} = \frac{200}{180+20/10} \rightarrow \underline{1,1x}$

f) $\underline{5h}$

g) $q_{max} = \frac{200}{10+20+5} \rightarrow \underline{4,88x}$

$$h). \text{ MIPS} = \frac{648 \cdot 10^{15}}{10^6 \cdot 200 \cdot 3600} = \underline{9000}$$

$$\text{MFlops} = \frac{72 \cdot 10^{13}}{10^6 \cdot 200 \cdot 3600} = \underline{1000}$$

$$i). \text{ MIPS} = \frac{648 \cdot 10^{15} + 13 \cdot 10^{15}}{10^6 \cdot (10 + 26 \cdot 5) \cdot 3600} = \underline{44783}$$

$$\text{MFlops} = \frac{72 \cdot 10^{13}}{10^6 \cdot (10 + 26 \cdot 5) \cdot 3600} = \underline{4.878}$$

$$j). \text{ PC}_{st} = \frac{1000}{120} \rightarrow \underline{8.33 \text{ w/flops/w}}$$

$$\text{superc.} = \frac{4.878}{30 \cdot 10 + 13 \cdot 90} = \underline{3.32 \text{ w/flops/w}}$$

$$k). \frac{4878}{\left(\frac{90 \cdot 13 \cdot 26}{41} + \frac{90 \cdot 1 \cdot 15}{41} + \frac{30 \cdot 10 \cdot 5}{41} \right)} \rightarrow \underline{6 \text{ w/flops/w}}$$

$$\text{gamy} = \frac{6}{3.32} = \underline{1.81x}$$